Association Between Neighborhood Context and Smoking Prevalence Among Asian Americans

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Objectives. To study neighborhood-level determinants of smoking among Asian Americans, we examined 3 neighborhood factors (ethnic enclave, socioeconomics, and perceived social cohesion) and smoking prevalence in a population-based sample.

Methods. We linked data from the 2003 California Health Interview Survey to tract-level data from the 2000 Census. We used multivariate logistic regression models to estimate the associations between smoking and neighborhood-level factors, independent of individual factors.

Results. Twenty-two percent of 1693 Asian men and 6% of 2174 Asian women reported current smoking. Women living in an Asian enclave were less likely to smoke (adjusted odds ratio [AOR]=0.27; 95% confidence interval [CI]=0.08, 0.88). Among men, higher levels of perceived neighborhood social cohesion were associated with lower odds of smoking (AOR=0.74; 95% CI=0.61, 0.91).

Conclusions. The association between contextual factors and smoking differed for men and women. For women, living in an Asian enclave may represent cultural behavioral norms. For men, neighborhood trust and cohesiveness may buffer stress. Smoking prevention and cessation interventions among Asian Americans may be more effective if they address contextual factors. (*Am J Public Health*. 2009;99:885–892. doi:10.2105/AJPH.2007.131854)

Smoking increases the risk of cancer, cardiovascular disease, and respiratory diseases, and it is the leading cause of premature death in the United States.[1] Asian Americans are one of the fastest growing minority groups in the United States, and tobacco use is a significant public health problem in this community.[2] Several studies reported very high rates of smoking among Asian American men, higher than those in the general US male population.[2–4] Although smoking prevalence is notably low among Asian American women,[2–5] at least 1 national study showed a marked increase in smoking rates among Asian American girls in the 7th through 12th grades,[6] which suggests that tobacco use is a growing problem for Asian American women. Previous studies have shown that multiple individual-level factors besides gender are related to smoking in Asian Americans, including ethnicity, education, marital status, psychosocial factors, and acculturation.[3–5,7–13] Several recent studies have also shown that neighborhood-level characteristics, specifically economic deprivation, are related to greater risk of smoking in non-Asian populations.[14–20] To the best of our knowledge, however, no studies have examined whether and how neighborhood-level factors affect smoking prevalence in Asian Americans and whether they affect men and women differently.

Most Asian Americans are immigrants, and studies of other immigrant communities suggest that living in an ethnic enclave may positively influence health through stronger social cohesion, social networks, and socioeconomic structure.[21–23] Although little is known about neighborhoods and health among Asian Americans, neighborhood context may influence smoking in Asian Americans through several pathways. Evidence exists that the tobacco industry is targeting Asian American communities,[24] which may lead to more advertising and availability of tobacco in Asian neighborhoods.

It is also likely that the neighborhood's ethnic composition influences social interactions, which in turn can affect the transmission of health-related information and perceived social norms toward smoking. Living in an ethnic enclave may also strengthen community-level social support or cohesiveness. Perceived neighborhood social cohesion,[25] which is defined as the "extent of connectedness and solidarity in a group," can affect smoking behaviors through social norms, as well as by being protective against depression or buffering against stress, both of which have been linked to smoking.[10,11,26] Neighborhood socioeconomic status has been linked to stress[16,18–20] and may also be associated with the availability of health information, access to health care, and the availability of resources to stop smoking.

We investigated whether neighborhood social and cultural context (socioeconomics, ethnic composition, and individual perceptions of social cohesion) were associated with smoking in Asian Americans, independent of individual characteristics. We also, to the extent the data allowed, examined whether neighborhood factors operated differently for men and women and across Asian subgroups.

METHODS

We used cross-sectional data from the 2003 California Health Interview Survey (CHIS). The CHIS is a population-based telephone survey of civilian households selected through random-digit dialing. The CHIS is designed to provide population-based estimates for California's overall population and its major racial/ethnic groups.

One adult per household was randomly selected and asked to give verbal consent. The sample for this analysis was restricted to men and women 18 years and older. Respondents were interviewed in English, Spanish, Mandarin, Cantonese, Vietnamese, or Korean. Data were collected between August 2003 and February 2004. For the CHIS adult sample, the adult interview response rate was 60%,[27] which is comparable to telephone surveys carried out by the National Center for Health Statistics. The CHIS data were weighted to account for the complex sample design and to adjust for nonresponse and households without telephones.[28] The final CHIS 2003 estimates were consistent

with estimates from the 2003 California Department of Finance Population Projections.[27]

We linked the 2003 CHIS data to tract-level data from the 2000 Census.[29] Each census tract was defined as 1 neighborhood. There were 2039 neighborhoods, and 62% of the neighborhoods contained 1 respondent.

Dependent Variable

The main dependent variable was self-reported current smoking. According to answers to 2 separate questions, current smoking was defined as having smoked at least 100 cigarettes in one's lifetime and currently smoking every day or some days. Responses were dichotomized into either yes or no.

Independent Variables

Neighborhood variables. The 3 main independent variables were living in a neighborhood that was at least 50% Asian, neighborhood socioeconomic status (SES), and individual perceptions of neighborhood social cohesion. We also examined neighborhood ethnic composition by using a continuous variable, proportion of Asians in the census tract; this was constructed from the percentage of the population in the census tract that was Asian American and ranged from 0 to 1.00. In the multivariate regression models, we modeled the Asian neighborhood variable both by using the continuous variable and by using the dichotomous cutoff of living in a neighborhood that was at least 50% Asian or more (yes or no). Use of the continuous variable did not change the direction or significance of the association between smoking and neighborhood ethnic composition. Thus, we present the results from the use of the dichotomous variable because it allows for easier interpretation of the odds ratio.

Neighborhood-level SES was constructed from 4 census tract characteristics: concentrated affluence, concentrated poverty, percentage of college-educated residents, and percentage of home ownership. The coefficient of α of these 4 variables was 0.83. Higher scores indicated higher neighborhood SES.

The third neighborhood variable was not actually an area-level variable, but reflected respondents' perceptions of their neighborhood. A scale of perceived neighborhood social cohesion[21,25,30] was constructed from 5 conceptually related items measuring the respondent's level of agreement (on a 4-point scale) with the following statements: (1) "People in my neighborhood are willing to help each other," (2) "People in this neighborhood generally do not get along with each other," (3) "People in this neighborhood can be trusted," (4) "People in this neighborhood do not share the same values," and (5) "Most people in this neighborhood know each other." We reverse coded statements 1, 3, and 5 for scale construction. The coefficient of α was 0.70, with higher scores indicating higher levels of perceived social cohesion in the neighborhood.

We used principal component factor analysis with orthogonal rotation to construct measures of neighborhood SES and social cohesion. The 2 factor scores were standardized, so the regression coefficients represent the effect of 1 standard deviation difference in the score.

Sociodemographic variables. Demographic variables included race/ethnicity, marital status (married versus nonmarried), gender, age (18–29 years, 30–39 years, 40–49 years, 50–64 years, and 65 years or older), and 2 measures of SES. The CHIS does not have a validated acculturation scale, so we used 2 proxies of acculturation: home language use and percentage of life lived in the United States.

Individuals were classified by self-report as Asian. The 2003 CHIS allowed for the disaggregation of some of the Asian groups: Chinese, Filipino, Japanese, South Asian, Korean, and Vietnamese. There was also an "other Asian" group that included individuals who did not identify with any of these 6 Asian groups.

SES was measured by education and poverty income ratio. Education was categorized as less than high school, high school graduate, some college, and college graduate. The poverty income ratio is a ratio where the numerator is a family's household income and the denominator is the appropriate poverty threshold (i.e., federal poverty level) given the family's size and composition. Poverty thresholds are determined by the Census Bureau. Thus, a poverty income ratio of less than 100% indicates that the household is living below the poverty threshold. The poverty income ratio was categorized as 0% to 99%, 100% to 199%, 200% to 299%, and 300% and greater of the 2000 federal poverty level. Because there was a linear relation between smoking and education and between smoking and poverty income ratio, education and poverty income ratio were each entered as single ordinal variables in the regression models.

Percentage of life lived in the United States was constructed as a linear variable based on the number of years lived in the United States and the respondent's age. Home language was determined by the answer to the question, "What language do you speak at home?" Respondents were classified into 1 of 3 categories: speaks only English, speaks English and another language, or speaks only a non-English language.

Our logistic regression models also included a marker of self-perceived mental health, because previous studies showed that worse mental health is correlated with smoking.[31,32] To capture mental health, we used a general mental health question from the 2003 CHIS, "Now, thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?" A person who reported 14 or more days was identified as having frequent mental distress. This 14-day minimum period has been used in other studies and is considered a marker for clinical depression and anxiety disorders.[32,33] We created a dichotomous variable and categorized individuals as reporting frequent mental distress or not reporting frequent mental distress.

Statistical Methods

All estimates and analyses were weighted by using replicate weights, provided by the CHIS, to adjust for nonresponse and the complex survey design. First, we present the descriptive statistics for the Asian sample. For the neighborhood scales, we present the statistics for the individual items that constitute neighborhood SES and social cohesion, rather than presenting the statistics for the factor scores (because they are standardized). We then constructed a series of logistic regression models with robust standard errors, in which the outcome was self-reported current smoking. The use of robust standard errors takes within-tract clustering into account.[34] All logistic regression models were stratified by gender. First, we examined the association between smoking and individual-level variables. Next, we sequentially added the 3 neighborhood variables to the model.

Only the full model (with all the neighborhood variables) is presented here. The

estimates and effect sizes for each of the neighborhood variables were very similar in models that contained only 1 neighborhood variable and in the full model. Last, we stratified the full model by ethnicity. Because of small sample sizes for South Asians, Japanese, and "Other Asians" and the very low smoking prevalence among Asian women, we present the ethnicity-specific multivariate models for only Chinese, Filipino, Korean, and Vietnamese men. We did not use random effects models in this research because 1 of our 3 neighborhood variables (perceived social cohesion) was based on individual survey responses and therefore was not a group-level variable and because most respondents were the only sampled resident of their census tract. Analyses were conducted with STATA version 9.0 (StataCorp LP, College Station, TX).

RESULTS

The sample included 3875 Asian adults, 56% of whom were women (Table 1). The Asian sample from the 2003 CHIS was ethnically diverse: one third of respondents self-identified themselves as Chinese, 18% as Filipinos, 13% as Koreans, 12% as Vietnamese, 10% as South Asian, 9% as Japanese, and 5% as other Asian. Thirty-two percent of respondents were living below 200% of the federal poverty level, and 50% reported having a college degree or more. On average, the Asian respondents in CHIS had been living in the United States for 68% of their lives, and 30% did not speak any English in the home. Consistent with national estimates, 7% of respondents reported frequent mental distress.[33]

Respondents lived in neighborhoods in which, on average, 35% of the families had annual incomes of $75 000 or more and in which 41% of residents were college educated (Table 1). Most respondents said that people in their neighborhood were willing to help each other (87%) and that people in the neighborhood could be trusted (84%). However, only 51% said that people in the neighborhood shared similar values. Forty-one percent of Asians in the 2003 CHIS sample lived in census tracts that were at least 25% Asian, and 12% lived in a tract that was more than 50% Asian.

Smoking rates varied markedly by gender and ethnicity (Table 2). Rates were high among men in all Asian subgroups except Chinese and South Asian, with 25% of Filipinos, 37% of Koreans, 30% of Vietnamese, 20% of Japanese, and 20% of other Asian men reporting being a current smoker. The smoking rates among Asian women were generally low, ranging from 2% to 8% for all groups except Japanese women, 15% of whom smoked. As a comparison, among non-Hispanic Whites in the 2003 CHIS, 19% of

TABLE 1—Weighted Sample Characteristics of Asian Americans: California Health Interview Survey, 2003

Sample size,[a] no.	3875
Women, no. (%)	2174 (56)
Age, y, mean (SD)	43 (0.23)
Ethnicity, no. (%)	
Chinese	1264 (33)
Filipino	689 (18)
Korean	492 (13)
Vietnamese	470 (12)
Japanese	360 (9)
South Asian	400 (10)
Other Asian	200 (5)
Household income as percentage of federal poverty level, no. (%)	
0–99	588 (15)
100–199	655 (17)
200–299	542 (13)
≥300	2090 (55)
Education, no. (%)	
Less than high school	366 (11)
High school diploma	721 (18)
Some college	752 (21)
College degree or more	2036 (50)
Married, no. (%)	2408 (62)
Employed, no. (%)	2406 (63)
Percentage of life lived in the United States, mean (SD)	52 (0.68)
Language spoken at home	
Speaks only English at home, no. (%)	775 (20)
Speaks English and other language at home, no. (%)	1938 (50)
Does not speak English in the home, no. (%)	1162 (30)
Self-reported frequent mental distress, no. (%)	276 (7)
Components of the neighborhood SES scale, mean (SD)	
Percentage of families with annual income ≥$75 000	35 (0.03)
Percentage of individuals in poverty	11 (0.18)
Percentage of college-educated residents	41 (0.26)
Percentage of home ownership	57 (0.51)
Components of the neighborhood social cohesion scale, no. (%)	
Neighborly helpfulness (yes)[b]	3354 (87)
People do not get along with each other (yes)[c]	662 (17)
Neighborly trust (yes)[d]	3236 (84)
People do not share the same values (yes)	1985 (51)
People know each other (yes)[e]	2308 (60)

Continued

TABLE 1—*Continued*

Percentage of Asians living in a census tract, no. (%)	
25% Asian residents	1606 (41)
50% Asian residents	465 (12)

Note. SES = socioeconomic status.
[a]All sample statistics were calculated on the basis of the weighted sample size shown in this row.
[b]Based on the respondent's level of agreement with the statement, "People in my neighborhood are willing to help each other." The item presented here was dichotomized into 2 levels: strongly agree or agree (yes) versus strongly disagree or disagree (no).
[c]Based on the respondent's level of agreement with the statement, "People in this neighborhood generally do not get along with each other." The item presented here was dichotomized into 2 levels: strongly agree or agree (yes) versus strongly disagree or disagree (no).
[d]Based on the respondent's level of agreement with the statement, "People in this neighborhood can be trusted." The item presented here was dichotomized into 2 levels: strongly agree or agree (yes) versus strongly disagree or disagree (no).
[e]Based on the respondent's level of agreement with the statement, "Most people in this neighborhood know each other." The item presented here was dichotomized into 2 levels: strongly agree or agree (yes) versus strongly disagree or disagree (no).

TABLE 2—Weighted Smoking Rates, by Ethnicity and Gender: California Health Interview Survey, 2003

	Men, No. (%)	Women, No. (%)
Chinese	77 (14)	16 (2)
Filipino	66 (25)	34 (8)
Korean	71 (37)	32 (8)
Vietnamese	71 (30)	4 (2)
Japanese	24 (20)	25 (15)
South Asian	23 (18)	7 (4)
Other Asian	20 (20)	9 (7)
Non-Hispanic White	1882 (19)	2367 (16)

men and 16% of women reported currently smoking.

The association between smoking, individual factors, and neighborhood level factors are described in Table 3 for Asian men and Asian women separately. Among Asian men, increasing education was associated with lower odds of smoking (adjusted odds ratio [AOR]= 0.76; 95% confidence interval [CI]=0.66, 0.92). Among both Asian men and women, being married was associated with significantly lower odds of smoking (men, AOR=0.57; 95% CI=0.36, 0.90; women, AOR=0.36; 95% CI=0.21, 0.63). Frequent mental distress was associated with higher odds of smoking among Asians (men, AOR=2.93; 95% CI=1.59, 5.39; women, AOR=3.60; 95% CI=1.84, 7.05.) Language use at home had opposite associations with smoking for men and women, but the association was significant only for women. Women who spoke no English in the home were significantly less likely to smoke than were women who spoke only English at home (AOR=0.33; 95% CI=0.12, 0.88).

Neighborhood SES was not a significant correlate of smoking for men or women (Table 3, model 2). Increasing perceptions of neighborhood social cohesion were associated with a significantly lower odds of current smoking among Asian men (AOR=0.74; 95% CI=0.61, 0.91), after adjustment for individual sociodemographic factors, frequent mental distress, neighborhood SES, and living in a neighborhood that was at least 50% Asian. Among women, living in a neighborhood that was at least 50% Asian was independently associated with a significantly lower odds of smoking (AOR=0.27; 95% CI=0.08, 0.88), after adjustment for individual factors including home language use and percentage of life lived in the United States.

Neighborhood effects stratified by ethnicity for Chinese, Filipino, Korean, and Vietnamese men are presented in Table 4. Individual perceptions of social cohesion were still significantly protective against smoking for Filipino and Korean men despite the smaller sample sizes (Filipino men, AOR=0.60; 95% CI=0.37, 0.99; Korean men, AOR=0.49; 95% CI=0.25, 0.99), but not for Chinese or Vietnamese men. The direction of the association, however, was similarly protective for Vietnamese men. Although associations were not statistically significant, living in an Asian neighborhood had opposite associations for Chinese men than for Korean, Vietnamese, or Filipino men.

DISCUSSION

To our knowledge, our study was the first to examine how neighborhood factors are related to smoking among Asian Americans and how these factors differ by gender. Although neighborhood SES and income inequality have repeatedly been associated with smoking,[14,16,19,20,26,35–38] we found that neighborhood SES was not relevant to smoking behavior among Asian Americans. Our findings add to a small but growing number of studies that have shown gender and racial/ethnic variation in the association between neighborhood SES and smoking.[14,37–40]

We also found that living in an Asian enclave was protective against smoking for Asian American women. This association was independent of acculturation. Living in an ethnic enclave may influence smoking among Asian women by establishing social and cultural norms. Because most Asian Americans are immigrants, it is likely that their smoking behaviors mirror those in Asian countries, where smoking rates among women are very low[41] and where smoking by women is perceived negatively and considered inappropriate.[42,43] A study of Asian American adolescents found that acculturation and perceived social norms were both associated with smoking among Asian American girls[44]; mechanisms related to acculturation and social norms may underlie our finding of lower smoking rates among Asian American women in enclaves. Because Asian American girls and women who are acculturating are at risk for smoking initiation,[9,13,44,45] and because most Asian American women start smoking as young adults,[46] we need

TABLE 3—Multivariate Logistic Regression Models of the Association Between Smoking, Individual Factors, and Neighborhood Factors Among Asian Americans: California Health Interview Survey, 2003

	Model 1, OR (95% CI)	Model 2, OR (95% CI)
Asian men (n = 1693)		
Age, y		
18–29 (Ref)	1.00	1.00
30–39	1.38 (0.70, 2.72)	1.39 (0.71, 2.74)
40–49	1.62 (0.91, 2.89)	1.73 (0.96, 3.09)
50–64	0.93 (0.51, 1.72)	0.92 (0.50, 1.72)
≥65	0.46* (0.23, 0.93)	0.48* (0.24, 0.97)
Increasing % poverty income ratio[a]	0.98 (0.81, 1.19)	1.03 (0.84, 1.26)
Increasing education[b]	0.76** (0.66, 0.92)	0.76** (0.62, 0.92)
Employed	0.95 (0.55, 1.62)	0.95 (0.56, 1.63)
Married	0.57* (0.36, 0.90)	0.60* (0.38, 0.95)
Frequent mental distress	2.93*** (1.59, 5.39)	2.84*** (1.52, 5.31)
Percentage of life lived in the United States[c]	1.00 (0.99, 1.00)	1.00 (0.99, 1.01)
Language spoken at home		
Speaks English at home (Ref)	1.00	1.00
Speaks English and other language at home	1.37 (0.76, 2.48)	1.38 (0.75, 2.54)
Does not speak English at home	1.38 (0.72, 2.66)	1.33 (0.67, 2.63)
Neighborhood SES[d]		0.98 (0.80, 1.19)
Neighborhood social cohesion[e]		0.74** (0.61, 0.91)
Living in a census tract that has high concentration of Asians (≥50% Asian)		1.07 (0.61, 1.88)
Asian women (n = 2174)		
Age, y		
18–29 (Ref)	1.00	1.00
30–39	1.54 (0.63, 3.75)	1.53 (0.63, 3.70)
40–49	2.01 (0.78, 5.15)	2.01 (0.81, 4.99)
50–64	1.32 (0.52, 3.33)	1.33 (0.53, 3.33)
≥65	0.60 (0.19, 1.91)	0.59 (0.19, 1.85)
Increasing % poverty income ratio[a]	1.14 (0.84, 1.56)	1.15 (0.83, 1.61)
Increasing education[b]	0.84 (0.64, 1.11)	0.84 (0.63, 1.10)
Employed	0.84 (0.64, 1.11)	1.19 (0.60, 2.37)
Married	0.36*** (0.21, 0.63)	0.36*** (0.21, 0.63)
Frequent mental distress	3.60*** (1.84, 7.05)	3.56*** (1.81, 7.01)
Percentage of life lived in the United States[c]	1.01 (1.00, 1.02)	1.01 (1.00, 1.02)
Language spoken at home		
Speaks English at home (Ref)	1.00	1.00
Speaks English and other language at home	0.52 (0.24, 1.11)	0.54 (0.25, 1.16)
Does not speak English at home	0.33* (0.12, 0.88)	0.36* (0.13, 0.96)
Neighborhood SES[d]		1.01 (0.75, 1.38)
Neighborhood social cohesion[e]		1.00 (0.78, 1.30)
Living in a census tract that has high concentration of Asians (≥50% Asian)		0.27* (0.08, 0.88)

Note. OR = odds ratio; CI = confidence interval; SES = socioeconomic status. Model 1 only includes individual-level factors; Model 2 includes individual- and neighborhood-level factors.
[a]Percentage Poverty income ratio was treated as a continuous variable in the models. It had 4 levels: 0% to 99%, 100% to 199%, 200% to 299%, and 300% or more of the federal poverty level.
[b]Education was treated as a continuous variable in the models. It had 4 levels: less than high school, high school diploma, some college, and college degree or more.
[c]ORs presented in this row correspond with a 20% increase in the percentage of life spent living in the United States.
[d]Neighborhood SES was measured by a factor score of concentrated affluence, concentrated poverty, percentage of college-educated residents, and the percentage of house ownership. Higher scores indicate higher stock of socioeconomic resources in the neighborhood.
[e]Neighborhood social cohesion was measured by reported perceptions of the extent of social connectedness, trust, and solidarity among neighbors. Higher scores indicate higher levels of social cohesion in the neighborhood.
*$P \leq .05$; **$P \leq .01$; ***$P \leq .001$.

TABLE 4—Ethnicity-Specific Multivariate Logistic Regression Predicting Current Smoking Among Asian Men: California Health Interview Survey, 2003

	Chinese, OR (95% CI)	Filipino, OR (95% CI)	Korean, OR (95% CI)	Vietnamese, OR (95% CI)
Sample totals, no.	540	297	189	228
Neighborhood SES[a]	1.30 (0.89, 1.90)	0.74 (0.47, 1.17)	0.93 (0.49, 1.78)	0.78 (0.42, 1.45)
Neighborhood social cohesion[b]	1.08 (0.71, 1.65)	0.60* (0.37, 0.99)	0.49* (0.25, 0.99)	0.70 (0.39, 1.26)
Census tract has high concentration of Asians[c]	0.48 (0.17, 1.37)	1.78 (0.57, 5.55)	2.50 (0.42, 15.0)	1.97 (0.72, 5.36)

Note. OR = odds ratio; CI = confidence interval; SES = socioeconomic status. Model 2 was refit for the 4 Asian ethnic groups in this table because of small sample sizes for South Asians, Japanese, and "Other Asians" and the very low smoking prevalence among Asian women. All models were adjusted for age, poverty status, education, marital status, employment status, frequent mental distress, percentage of life in the United States, and language use at home.

[a]Neighborhood SES was measured by a factor score of concentrated affluence, concentrated poverty, percentage of college-educated residents, and the percentage of house ownership. Higher scores indicate higher stock of socioeconomic resources in the neighborhood.

[b]Neighborhood social cohesion was measured by reported perceptions of the extent of social connectedness, trust, and solidarity among neighbors. Higher scores indicate higher levels of social cohesion in the neighborhood.

[c]This was a dichotomous variable (yes or no) for living within census tract with a concentration of 50% or more of Asians.

*$P \leq .05$.

to better understand which aspects of social and cultural norms are protective against smoking for Asian American women. We also need to determine whether incorporating these norms into smoking prevention interventions can increase their effectiveness.

Among Asian American men, we found that higher perceived social cohesion was protective against smoking. A study of mostly non-Hispanic White adults in Minnesota found that higher area-level and individual perceptions of social cohesion were associated with lower odds of smoking.[47] Low social cohesion may be a marker of stress, depression, and low social support, all of which have been previously linked to smoking.[10,48,49] However, it is likely that perceived social cohesion is more than just a marker of poor mental health, because the association between perceived social cohesion and smoking remained, even after we adjusted the analysis for general mental health. Higher social cohesion has been posited to improve information sharing, which may result in increasing awareness about the negative health effects of smoking.[50,51] Higher social cohesion may also be a marker of social inclusion and higher social status,[15] both of which may protect men from smoking. Our finding that individual perceptions of neighborhood social cohesion were particularly relevant for Filipino and Korean men highlights the importance of subgroup analysis, when possible, for Asian Americans. Further study is needed to determine the pathways that link social cohesion and health behavior. Interventions aimed at smoking prevention and cessation among Asian American men may be more successful if they address some of the underlying psychosocial issues and neighborhood factors that lead to smoking.

Few studies have explored whether gender modifies the association between neighborhood factors and health outcomes.[15,52–54] A study of neighborhood social disorder found that neighborhood social disorder was associated with higher rates of smoking in men but not in women.[15] Why perceived social cohesion and living in an Asian enclave affected smoking among Asian American men and women differently is not readily apparent. Among women, perceptions of neighborhood social cohesion were not associated with smoking. Asian American women's smoking behavior may be less influenced by neighborhood social cohesion than by men's smoking behavior because of the strong cultural norm that smoking is inappropriate for women and because their social ties and social networks are likely different from those of men. Among Asian American women, family-level cohesion and family ties may be more salient than neighborhood cohesion. A study of Mexican American women found that lower family cohesion was associated with higher smoking rates, independent of acculturation.[55] Studies have shown that smoking among Asian women is influenced by family attitudes.[41,56,57] Future studies should explore whether family cohesion influences smoking in Asian American women and how the influence of family compares with those of neighborhood social cohesion.

It is interesting that living in an ethnic enclave was not associated with smoking among Asian American men. On the basis of research showing that smoking is an accepted and normative behavior for Asian men,[2,11,43,48,58] we expected that living in an Asian neighborhood would be associated with higher smoking rates among Asian American men. Although the direction of the association was generally consistent with this hypothesis, the results were not significant. It is plausible that social norms and cultural expectations exert less control on smoking behavior among Asian American men than they do among Asian American women.

Limitations

Our study had several limitations. The cross-sectional data limited our ability to make causal inferences about the neighborhood environment and smoking. Even longitudinal observational data would not resolve the direction of causality because of the possibility that people select their neighborhood on the basis of personal characteristics (selection bias). We also had no knowledge of how long participants had lived in the neighborhood, and duration of residency may matter in neighborhood perceptions and in health. There is no operationalized definition of an Asian enclave, and so we used the proportion of Asians in the census tract, with 50% Asian being the cutoff to define an enclave. We did model enclave by using a continuous proportion, as well as different cutoffs, none of which affected our main results.

Neighborhood social cohesion was based on individual perceptions and could not be

aggregated to the neighborhood level because most neighborhoods in this study had only 1 respondent. However, individual perception of neighborhood social cohesion is considered an important measure of neighborhood context[25] and was previously associated with health outcomes.[47,59,60] Our measure of smoking was based on self-report and was subject to response bias.

In addition, the study was based in California, and these results are not necessarily generalizable to Asian Americans in other places. According to the Behavioral Risk Factor Surveillance System, California has the lowest tobacco use of any state except Utah.[61] Investigation of pattern differences among gender and ethnicity subgroups was limited by our sample size, even though we oversampled Asian Americans. Larger studies would be valuable to assess whether our findings are replicable and consistent across other Asian subpopulations and men and women.

Conclusions

Our results suggest that neighborhood context should be considered when addressing smoking among Asian Americans and that the effects of contextual factors on smoking vary by gender. Community-based participatory research and qualitative studies may be able to elucidate the meaning of cultural norms and social cohesion for Asian Americans, identify some of the factors that increase social cohesion and promote antismoking norms, and possibly, incorporate these concepts into smoking prevention and cessation efforts. ■

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N.R. Kandula designed the study, conducted the data analysis, and drafted the article. M. Wen contributed to the conceptualization of the area-level measures, interpreted findings, and provided comments on drafts. E.A. Jacobs assisted with conceptualizing the study questions and provided comments on drafts. D.S. Lauderdale contributed to the conceptualization of the study, interpreted findings, and wrote sections of the article.

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Human Participant Protection

This study was approved by the institutional review board at Northwestern University.

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